ISSN 1028-334X, Doklady Earth Sciences, 2017, Vol. 477, Part 1, pp. 1348–1352. © Pleiades Publishing, Ltd., 2017.
Original Russian Text © A.S. Biakov, N.A. Goryachev, I.L. Vedernikov, I.V. Brynko, E.V. Tolmacheva, 2017, published in Doklady Akademii Nauk, 2017, Vol. 477, No. 3, pp. 335–340.

GEOCHEMISTRY

New Results of U–Pb SHRIMP Dating of Zircons from Upper Wuchiapingian (Upper Permian) Deposits in Northeastern Russia

A. S. Biakov[a,b,c,*], Corresponding Member of the RAS N. A. Goryachev[a], I. L. Vedernikov[a], I. V. Brynko[a], and E. V. Tolmacheva[d]

Received January 31, 2017

Abstract—The first results are presented for U-Pb SHRIMP-II dating of zircons from the upper part of the Khivachian regional horizon (stage) of the Regional Stratigraphic Scale (RSS) of the Permian in northeastern Russia. The obtained isotope age of 255 ± 2 Ma is close to that of the present boundary between the Wuchiapingian and Changhsingian stages of the Permian system in the International Stratigraphic Scale (254.1 Ma). Based on the distribution of bivalves—*Intomodesma* spp. and *Claraioides* aff. *primitivus* (Yin)—in the sections considered, their relations to the stratigraphic positions of the samples considered and dated formerly, and in view of the interregional correlation of recent $\delta^{13}C_{org}$ data for clayey rocks, one may assume with certainty that most of the regional zone of *Intomodesma costatum* corresponds to the upper part of the Wuchiapingian stage. Here, the Changhsingian stage in northeastern Asia complies only with the uppermost part of this zone within the *I. postevenicum* subzone and, partially, of *Otoceras* layers within the *Otoceras concavum* zone.

DOI: 10.1134/S1028334X17110186

The correlation of Upper Permian deposits in northeastern Asia to the stages of the International Stratigraphic Scale (ISS) for the Permian system is one of the most intractable current problems of stratigraphy of the region. In solving this problem, a considerable role is played by the SHRIMP and TIMS techniques for absolute geochronological dating of zircons from tuff interlayers [1–3].

In this respect, the most promising are the sections containing sedimentation-synchronous tuffs of the Okhotsk, Ayan-Yuryakh, and Balygychan back-arc basins of the Okhotsk–Taigonos volcanic arc. The authors had formerly explored here the continuous Permian sections characterized well by fossil fauna. Some of the sections are typical for the zonal succession of bivalves revealed based upon the evolution of the representatives of two genera of *Inoceramus*-like bivalves: *Maitaia* and *Intomodesma* [4]. Hence, the dating, calibration, and correlation of the bivalve zones distinguished are important for solving the problem of the correlation of Upper Permian deposits in the region as a whole.

The authors have recently obtained substantial dating of isotope ages for the bottom part of the Khivachian regional horizon of the Upper Permian system in northeastern Asia [2]. The age came to 257 ± 3 Ma and corresponded to the lower part of the Wuchiapingian stage by the ISS. Moreover, two significant dates were obtained in parallel by the CA-IDTIMS technique at Boise State University (United States) for the samples for the upper part of the Gizhigian and the lower part of Khivachian regional strata (260.16 ± 0.4 and 258.14 ± 0.2 Ma, respectively) [3].

The present report considers the results of U–Pb SHRIMP II dating of zircons from the 3-cm interlayer of median-composition tuff from the section of the lower part of the Pautovaya series that we described formerly [5] (the upper part of the Khivachian regional horizon by the RSS of the Permian system in northeastern Russia).

The Pautovaya Formation of about 170 m in thickness in the section considered (Fig. 1) is presented by schistose mainly dark-gray to black silty argillites almost without lamination. The lower part contains interlayers (to 10 cm) of gray and light gray horizontally, lenslike, and obliquely laminated fine-grained feldspar–lithic sandstones and siltstones. Rare inter-

[a] *North-East Interdisciplinary Scientific Research Institute, Far East Branch, Russian Academy of Sciences, Magadan, 685000 Russia*
[b] *Kazan (Volga region) Federal University, Kazan, 420008 Russia*
[c] *North-Eastern State University, Magadan, 685000 Russia*
[d] *Institute of Precambrian Geology and Geochronology, St. Petersburg, 199034 Russia*
**e-mail: abiakov@mail.ru*